

Application No.: 10/681,445**Docket No.: 4459-134****REMARKS**

Applicants appreciate the Examiner's thorough review of the present application, and respectfully request reconsideration in light of the preceding amendments and the following remarks.

Claims 2-21 are pending in the application. Independent claims 4 and 11 have been amended to better define the claimed invention. Amended claims 4 and 11 find solid support in the original drawings, e.g., FIG. 3. No new matter has been introduced through the foregoing amendments.

The finality of the Office Action mailed January 4, 2005 is deemed premature and should be withdrawn. In particular, the Examiner's new ground of rejection raised against claim 4 was not necessitated by Applicant's amendments to claim 4.

Under present practice, second or any subsequent actions on the merits shall be final, except where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p). See MPEP, section 706.07(a) (emphasis added).

In this case, the Examiner introduces a new rejection against claim 4 which new rejection was neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p).

In particular, original claim 4 was amended by the October 29, 2004 Amendment only to include the limitations of original claim 1 from which original claim 4 depended. Apparently, such amendments did not change the scope of claim 4 at all. Therefore, the new ground of rejection of

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claim 4 as manifested in the January 4, 2005 Office Action was not necessitated by Applicants' amendments to original claim 4.

In addition, the new ground of rejection of claim 4 is based on *Newman* and *Brooks* which were not information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p). Rather, the newly applied references were discovered by the Examiner in a updated search. See the PTO 892 attached to the January 4, 2005 Office Action.

For the above advanced reasons, Applicants respectfully submit that the finality of the January 4, 2005 Office Action is premature and should be withdrawn.

The amendments introduced by this Amendment paper should, therefore, be entered as a matter of right.

Independent claims 4 and 11 have been amended to define the claimed invention over the art. In particular, the applied references clearly fail to disclose, teach or suggest the newly claimed limitation that the conductive vias electrically connect the metal coating and the chip contact pads. As can be seen in FIG. 6 of *Newman*, thermal vias 612 are not disclosed or suggested to electrically connect metal coating 620 and chip contact pads 514. Importantly, the applied references do not fairly teach or suggest how to dissipate the heat generated by the active surface of the semiconductor die.

Amended claim 4 recites a plurality of conductive vias formed through the reinforcement-containing insulating layer and electrically connecting the metal coating to the chip contact pads. Similarly, amended claim 11 recites a plurality of conductive vias extending through an entire thickness of the insulating layer and electrically connecting the metal coating to the chip contact pads. The added limitations find support in the application as filed. Specifically, in FIG. 3 of the instant invention, it has been disclosed that a semiconductor chip 220 has an active surface

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electrically connected to the chip contact pads 212 by means of solder joints 222, a metal coating 310 is formed on the lower surface of the substrate 210, and a plurality of conductive vias 320 are formed through the reinforcement-containing insulating layer 211 and electrically connect the metal coating 310 to the chip contact pads 212. Thus, the heat generated from the active surface of the semiconductor chip 220 can be conducted to the metal coating 310 through the conductive vias 320, and then dissipated to the outside environment through the metal coating 310 thereby enhancing the thermal performance of the package. It is noted that the heat amount generated from the active surface of the semiconductor chip 220 is greater than the heat generated from the back surface of the semiconductor chip 220. Thus, a very important advantage can be achieved by the claimed invention, i.e., the heat generated from the active surface of the semiconductor chip can be quickly dissipated via the conductive vias and the metal coating.

As discussed above, the applied references do not fairly teach or suggest the newly claimed limitation. The applied references also fail to disclose or suggest how to obtain the above described important advantage of the claimed invention.

Although *Newman* discloses that thermal vias 612 serve to dissipate the heat generated by semiconductor die 502 through metal layer 620 (e.g., the disclosure at column 9, lines 39-41 and FIG. 6 of *Newman*), the reference fails to disclose or suggest that the contact pads 514 are electrically connected to the thermal vias 612. In other words, *Newman* only discloses that the thermal vias 612 are connected to the back surface of semiconductor die 502 and serve to dissipate the heat generated by the back surface of semiconductor die 502 through metal layer 620. Thus, *Newman* fails to disclose or suggest how to dissipate the heat generated by the active surface of the semiconductor die. In other words, *Newman* fails to achieve the advantage of the claimed invention that the heat generated from the active surface of the semiconductor chip can be quickly dissipated via the conductive vias and the metal coating.

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It should be now clear that the relationship among the thermal vias, metal layer, semiconductor die and contact pads disclosed by Newman is distinctly different from the relationship among the claimed conductive vias, metal coating, semiconductor chip and chip contact pads, because *Newman* fails to disclose how to quickly dissipate the heat generated by the active surface of the semiconductor die.

Brooks does not cure the deficiencies of *Newman*. *Brooks* only discloses a flip-chip configured die 14 carried in package 300, and a reference plane element 50 and strap 51 disposed on the backside surface of the flip-chip configured die 14 to provide a thermal path for heat dissipation (e.g., the disclosure at column 8, lines 4-31 and FIG. 5 of *Brooks*). The reference fails to disclose or suggest how to dissipate the heat generated by the active surface of the flip-chip configured die. In other words, *Brooks* fails to achieve the advantage of the claimed invention that the heat generated from the active surface of the semiconductor chip can be quickly dissipated via the conductive vias and the metal coating.

Accordingly, Applicants respectfully submit that (i) the relationship among the thermal vias, metal layer, semiconductor die and contact pads disclosed by *Newman* in view of *Brooks* is distinctly different from the relationship among the claimed conductive vias, metal coating, semiconductor chip and chip contact pads, and that (ii) both *Newman* and *Brooks* fail to disclose and suggest the advantage of the claimed invention that the heat generated from the active surface of the semiconductor chip can be quickly dissipated via the conductive vias and the metal coating. Therefore, amended independent claims 4 and 11 are not obvious over the applied references of *Newman* and *Brooks*.

Claims 2-3, 5-10 and 21 depend from claim 4, and are considered patentable at least for the reasons advanced with respect to claim 4. Claims 12-20 depend from claim 11, and are considered patentable at least for the reasons advanced with respect to claim 11.

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The 35 U.S.C. 103(a) rejection of claims 6 and 16 should be withdrawn in view of the amendments to and the arguments advanced with respect to independent claims 4 and 11, respectively.

Each of the Examiner's rejections has been traversed. Accordingly, Applicants respectfully submit that all claims are now in condition for allowance. Early and favorable indication of allowance is courteously solicited.

The Examiner is invited to telephone the undersigned, Applicant's attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

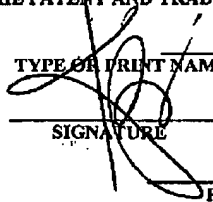
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